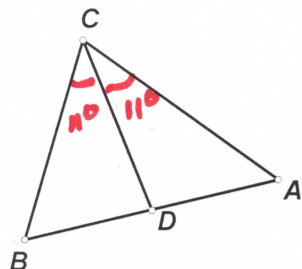


SEMESTER 1 FINAL REVIEW WORKSHEET #3

CHAPTER 5 – RELATIONSHIPS WITHIN TRIANGLES

1. If \overline{CD} is an *angle bisector* of $\triangle ABC$, mark the triangle and find x ,

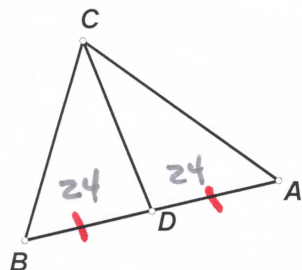


$$m\angle BCD = 4x + 3$$

$$m\angle ACD = 1 + 5x$$

$$\begin{aligned}\angle BCD &= \angle ACD \\ 4x + 3 &= 1 + 5x \\ 3 &= 1 + x \\ \boxed{2} &= x\end{aligned}$$

2. If \overline{CD} is a *median* of $\triangle ABC$, mark the triangle and find BD , and AB .

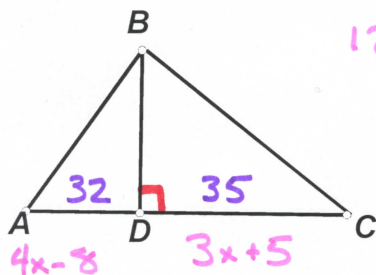


$$BD = 5x + 9$$

$$AD = 12 + 4x$$

$$\begin{aligned}BD &= AD \\ 5x + 9 &= 12 + 4x \\ x + 9 &= 12 \\ \boxed{x} &= 3\end{aligned}$$

3. Given that \overline{BD} is an *altitude* of $\triangle ABC$, find x , AD and AC if $m\angle BDC = 12x - 30$, $AD = 4x - 8$, and $DC = 3x + 5$.



$$\begin{aligned}\angle BDC &= 90^\circ \\ 12x - 30 &= 90 \\ 12x &= 120 \\ \boxed{x} &= 10\end{aligned}$$

$$\begin{aligned}AD &= 4x - 8 \\ &= 4(10) - 8 \\ &= 40 - 8 \\ &= 32\end{aligned}$$

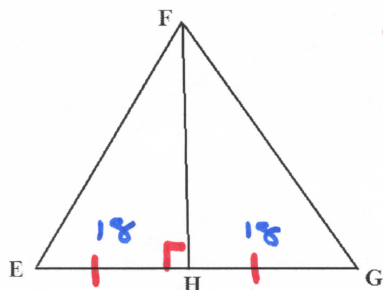
$$x = 10$$

$$AD = 32$$

$$\begin{aligned}DC &= 3x + 5 \\ &= 3(10) + 5 \\ &= 30 + 5 \\ &= 35\end{aligned}$$

$$AC = 67$$

4. If \overline{FH} is a *perpendicular bisector* and $\angle FHG = 5x - 15$, then find x and the measure of \overline{EG} if $EH = x - 3$



$$\begin{aligned}\angle FHG &= 90^\circ \\ 5x - 15 &= 90 \\ 5x &= 105 \\ x &= 21\end{aligned}$$

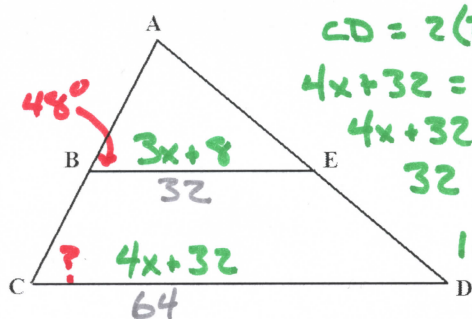
$$x = 21$$

$$\overline{EG} = 36$$

$$\begin{aligned}EH &= x - 3 \\ &= 21 - 3 \\ &= 18\end{aligned}$$

$$\begin{aligned}EG &= 2(EH) \\ &= 2(18) \\ &= 36\end{aligned}$$

5. Given that \overline{BE} is a *midsegment* of $\triangle ACD$. If $BE = 3x + 8$ and $CD = 4x + 32$, find the value of x .



$$\begin{aligned} CD &= 2(BE) \\ 4x + 32 &= 2(3x + 8) \\ 4x + 32 &= 6x + 16 \\ 32 &= 2x + 16 \\ 16 &= 2x \\ 8 &= x \end{aligned}$$

$$x = \underline{8}$$

If $m\angle ABE = 48^\circ$, find the $m\angle ACD$.

$$m\angle ACD = \underline{48^\circ}$$

6. According to the triangle inequality, can 3 cm, 5 cm, and 9 cm be the three sides of a triangle? Why or why not?

NO, THE 2 SMALLER SIDES MUST BE LARGER THAN THE 3RD SIDE

$$3 + 5 > 9 \quad 8 < 9 \Rightarrow \text{NOT A } \triangle$$

7. If two sides of a triangle are 4 in and 11 in, complete the inequality for the length of the third side " x "

$$\underline{7} < x < \underline{15}$$

$$\begin{aligned} x + 4 &> 11 \\ x &> 7 \end{aligned}$$

$$\begin{aligned} x + 11 &> 4 \\ x &> -7 \end{aligned}$$

$$\begin{aligned} x &< 11 + 4 \\ x &< 15 \end{aligned}$$

8. If you are given sticks of 100 ft., 140 ft., and 228.5 ft. would you be able to make a triangle? Why or why not? Support your answer with sound mathematical reasoning.

$$\begin{aligned} 100 + 140 &> 228.5 \\ 240 &> 228.5 \end{aligned} \quad \begin{aligned} \text{YES, THE 2 SMALLER SIDES ARE} \\ \text{LONGER THAN THE 3RD SIDE} \end{aligned}$$

9. If two sides of a triangle are congruent, then what do you know about the angles opposite those sides?

TWO SIDES CONGRUENT = ISOSCELES TRIANGLE, THE ANGLES OPPOSITE THE SIDES ARE ALSO CONGRUENT

10. The largest angle of a triangle is across from the LONGEST side, the smallest angle of a triangle is across from the SHORTEST side.

